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ABSTRACT

An interview of 64 students in eight 3rd- and 4th-grade classrooms and an assessment of their teachers' control orientation were conducted for the purpose of testing the hypothesis that students of autonomy-granting teachers are better means-ends thinkers than those of controlling teachers. Dimensions of students' classroom socialization of particular interest were task demands and interpersonal competence. Aspects of the task demands dimension included following directions and monitoring one's comprehension. The interpersonal dimension included outcomes such as sharing and being helpful. Student competence was assessed with a modified version of Shure and Spivak's (1972) means-ends problem-solving measure. Teacher control orientation, the dependent variable, was assessed with an instrument that reflected the extent to which teachers preferred to be controlling or autonomy-granting with students. Results indicated that students' problem-solving ability in the task demands domain was related to teacher control orientation in a way that was consistent with the literature on effective parenting. Results favored an "information internalization" model of classroom socialization. In regards to teacher control orientation, it was concluded that it is unrealistic to expect that one best approach to teaching exists. (RH)

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EIGHT TEACHERS' CONTROL ORIENTATIONS AND THEIR STUDENTS' PROBLEM-SOLVING ABILITY

Richard S. Prawat
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Abstract

Sixty-four students in eight elementary classrooms were interviewed in an attempt to assess an important aspect of classroom competence--means-ends problem-solving ability--in two socialization domains highly valued by teachers: the "task demands" and "interpersonal" domains of socialization. Results indicate that students' problem-solving ability in the task demands domain is related to teacher control orientation in a way that is consistent with the literature on effective parenting. According to this literature, successful socialization depends on the right mix of parental control and communication. Overall, results of the study favor an "information internalization" model of classroom socialization.

EIGHT TEACHERS' CONTROL ORIENTATIONS AND THEIR STUDENTS' PROBLEM-SOLVING ABILITY

Richard S. Prawat and Ariel L.H. Anderson[1]

The purpose of this study is to determine how teacher control orientation--a variable that has important implications for student motivation and self-esteem--relates to the development of children's competence in two important socialization domains in the classroom. Specifically, the focus is on autonomy granting and how that relates to task and interpersonal means-ends problem solving in third and fourth grade students.

Before developing a rationale for the study, it is important to define terms. In this study, socialization refers to the learning processes that enhance a student's ability to participate successfully within the classroom social system. One important assumption that guides the present work is that students face dual role demands: They must learn to adapt to the work requirements placed on them as individual students (the "task demands" dimension of socialization), while simultaneously learning to function as members of a classroom group (the interpersonal dimension). Thus, Lortie (1975) stressed that

> Students go to school, in part, to learn how to sustain work performance . . . [but] goals must be met and relationships managed in a group context. This feature is so obvious that it is often over looked. (p. 137)

The centrality of the task demands and interpersonal dimensions of socialization in the classroom has been established in earlier empirical work with teachers (Lambert & Nicoll, 1977; Prawat, 1980; Prawat, 1985). This research indicates that most teachers view task and interpersonal goals as valued learning outcomes in their own right, not merely as a means to an end (e.g., an orderly

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[1]Richard Prawat is coordinator of the Socialization Outcomes Project and professor of teacher education at Michigan State University. Ariel Anderson was a research assistant on the project and is currently assistant professor of education at Western Michigan University.

classroom). Furthermore, teachers recognize that successful adaptation to the student role involves fairly complex cognitive and attitudinal processes on the part of students (e.g., "thinking for themselves," thinking of how their actions influence others).

Included under the task demands rubric are aspects of the student role such as following directions, turning in work on time, establishing work priorities, and monitoring one's understanding or comprehension. The interpersonal dimension is defined by outcomes such as sharing and being helpful, accepting others, and considering the possible consequences of one's social acts.

The task demands and interpersonal dimensions are thus considered to be key components of classroom competence. In the present study, it was decided to assess student competence in these areas using a modified version of Shure and Spivak's (1972) means-ends problem-solving measure. Whereas there are a number of ways that the ability to utilize knowledge can be assessed, this is one of the most promising. It taps three important problem-solving components: the ability to enumerate a number of relevant but different routes to a specific goal, the ability to anticipate potential obstacles to goal attainment, and awareness of the importance of time--the realization that goals are not reached immediately and that certain times are more propitious than others for the initiation of action. Thus far, Shure and Spivack's (1972) technique for assessing means-ends thinking in children has been limited to the interpersonal domain. In this domain, resourcefulness in solving hypothetical problems apparently does correlate with various indices of personal effectiveness (Higgins & Thies, 1981; Pellegrini, 1985; Spivack & Shure, 1974).

Because the ability to solve problems in both the interpersonal and task-demands domains is of interest in the present study, the Shure and Spivack

measure was modified accordingly. Specifically, two work-related problems (i.e., getting work in on time and understanding directions) were added to the instrument and two interpersonal problems were dropped. In the technique developed by Shure and Spivack, the child is provided with the beginning and the end of the story, and asked to "tell what happens in between." One of the task demands stories begins with the following premise:

> Rich is pretty smart but he has a lot of trouble getting his work done on time. Most of the time he has to use recess to finish up his assignments. Rick wishes he could finish his work on time so he could play during recess.

Students then are told, "The story ends with Rick getting his work done on time and being able to play during recess."

Using the same format, one of the interpersonal stories depicts a child who is having difficulty breaking into a playgroup:

> It's recess time, and Johnny wants to play with his friends on the playground. His friends are all playing ball, but they won't let him play. Johnny feels very sad because he really wants to play with his friends.

The story ends with Johnny playing ball. In both types of stories, a successful outcome is described, and students are asked to supply the missing details. (When stories are presented, the sex of the protagonist is varied to match the sex of the student.)

A teacher level variable that previous research indicates might account for differences in students' problem-solving competence constitutes the key independent variable examined in this study: teacher control orientation. This variable is assessed by means of an instrument that yields scores reflecting the extent to which teachers prefer to be relatively more controlling or autonomy granting in their interactions with youngsters (Deci, Schwartz, Sheinman, & Ryan, 1981).

It was hypothesized that students of teachers who preferred to be more autonomy granting would be better means-ends thinkers. The rationale for this hypothesis is based on previous research indicating that parents can influence means-ends thinking in children as they deal with various problems situations (Jones, Rickel, & Smith, 1980; Kendall & Fischler, 1984). Teachers may be able to influence means-ends thinking by creating an environment that encourages students to monitor and regulate their own behavior. It was thought that teacher control orientation would be a relevant variable in this regard. This variable has emerged as an important predictor of outcomes, such as student self-esteem and autonomy, in recent work by Deci and his colleagues (Deci, Nezlek, & Sheinman, 1981; Deci, Schwartz, Sheinman, & Ryan, 1981).

Apparently, autonomy-granting teachers provide more opportunity for students to exercise self-control and self-regulation. This is consistent with the literature on children rearing summarized by Spivack, Platt, and Shure (1976). According to this research, a child-centered, nonauthoritarian approach to child rearing on the part of parents contributes to social problem-solving ability in children. It is unlikely, they conclude, that child-rearing styles that appeal to rules and authority relations will be conducive to the development of social problem-solving ability in youngsters. In the present study, therefore, it was thought students of teachers who were more willing to grant autonomy would be more effective means-ends thinkers in the two socialization domains.

Method

Subjects

Sixty-four third and fourth graders (balanced by sex within class) were drawn from eight classrooms, with eight students per classroom. This age

range was selected for two reasons: First, it was thought that such students would be old enough to respond to the problem-solving measures that tap important aspects of student competence; second, according to work by Blumenfeld and colleagues (Blumenfeld, Hamilton, Bossert, Wessels, & Meece, 1983), this age range represents an important period for socialization into the student role. Selection of students was made by imposing a specific set of criteria on teachers' ratings of children's competence in the classroom. For this purpose, an adapted version of Harter's (1979) Teacher's Rating Scale of Child's Actual Competence was used.

Students were selected to represent a range in terms of teacher perceptions of their competence in meeting task and interpersonal demands. As much as possible, variation in academic performance was controlled for. Thus, children who received extreme ratings on the intellectual competence subscale of the Harter measure were eliminated from the study (i.e., all target students scored above 2.3 and below 3.7 on this four-point scale). Students were heterogeneous with regard to ethnicity: The minority population of classrooms involved in the study averaged approximately 33%. All eight classroom teachers were female, with an average of 20 years teaching experience.

To summarize, the sample consisted of 64 elementary school students in eight classes, with 4 male and 4 female students selected from each class to represent a range from high to low in terms of teacher ratings of competence in meeting task and interpersonal demands.

Means-Ends Problem Solving

Student interview responses constitute the primary data of this investigation. Researchers interviewed students during a two- to three-week period in early spring. Interviewers were blind as to the competence level of subjects

(based on teacher ratings). Researchers assessed students' means-ends problem-solving ability in both the task demands and interpersonal socialization domains.

Students responded to a series of four "open-middle" stories designed to measure children's means-ends thinking. Means-ends thinking has been defined as the "ability to carefully plan, step-by-step, means to reach a stated goal" (Shure & Spivack, 1972, p. 348). Means-ends thinking ability has been shown to relate to students' adjustment to both task demands and interpersonal aspects of classroom life (Higgins & Thies, 1981; Pellegrini, 1985; Shure & Spivack, 1972). In the present study, a modified version of the means-ends problem-solving measure (MEPS) developed by Spivack, Platt, and Shure (1976) was used to assess students' social problem-solving ability (see Kendall & Fischler, 1984, for additional references). The Spivack et al. measure was modified so that it was appropriate not only for assessing interpersonal problem solving, but also problem solving in the task demands area. Thus, open-middle stories representing problem situations in both socialization domains were included as shown in the previous section.

In the interpersonal domain, stories related to the issues of making friends and gaining entry into a play situation with one's friends. In the task demands domain, one story was concerned with understanding directions for a work assignment while the other dealt with the issue of pacing, or completing work on time. The basic procedure for administering the MEPS measure involved presenting students with beginnings and endings of stories and asking them to supply the middle segments which were missing. Researchers audiotaped, transcribed, and analyzed the content of student responses to develop unique coding systems for each of the four stories.

Specific scoring procedures are outlined in the Means-Ends Problem-Solving Stimuli and Scoring Procedures Supplement provided by Spivack, Shure, and Platt (1981). Briefly, the following procedures are employed: Three types of responses are identified in students' protocols: "means," "obstacles," and "time." A "means" is defined as "a discrete step that enables the story protagonist to get closer to the story goal . . . means in a story are sequenced steps" (p. 4). An "obstacle" is "an actual or potential interference with goal attainment . . . [which] almost always changes the direction of the plan for goal attainment" (p. 9). "Time" is scored "when specific reference to time is used . . . [or] when the protagonist waits for a propitious occasion" (pp. 11-12). In sum, a student's total means-ends score "is composed of an accumulation of different means, including the number of specific steps within each mean, the number of obstacles foreseen, and/or the number of time notations expressed" (Platt & Spivack, 1975, p. 111).

All of the students' responses to the problem-solving measure were coded independently by two researchers. The percentage of interrater agreement ranged between 81 and 91 for the four stories. Ultimately, all coding discrepancies were resolved to 100% agreement. MEPS scores were obtained for each student relating to interpersonal problem-solving ability and task-demands problem-solving ability. Internal consistency reliability (Cronbach's alpha) for the scale as a whole is adequate (.77); however, inter-item correlations differ rather dramatically on the two subscales--.53 on the task demands subscale versus .35 on the interpersonal subscale. Although both these correlations are highly significant, it is obvious that care should be exercised in the present study when talking about means-ends thinking in the interpersonal domain.

Teacher Control Orientation

Teachers were asked to respond to a questionnaire developed by Deci, Schwartz, et al. (1981), which gets at adults' orientation toward control versus autonomy. The Deci et al. scale consists of eight vignettes, each of which depicts a typical school problem. The following is an example of one of the vignettes; four possible ways of dealing with the problem situation are also presented, with each representing a different point along a continuum. Options range from highly controlling (HC), to moderately controlling (MC), to moderately autonomous (MA), to highly autonomous (HA).

> Jim is an average student who has been working at grade level. During the past two weeks he has appeared listless and has not been participating during reading group. The work he does is accurate but he has not been completing assignments. A phone conversation with his mother revealed no useful information. The most appropriate thing for Jim's teacher to do is:
>
> (MC) 1. She should impress upon him the importance of finishing his assignments since he needs to learn this material for his own good.
>
> (HA) 2. Let him know that he doesn't have to finish all of his work now and see if she can help him work out the cause of the listlessness.
>
> (HC) 3. Make him stay after school until the day's assignments are done.
>
> (MA) 4. Let him see how he compares with the other children in terms of his assignments and encourage him to catch up with the others. (p. 644)

For each vignette, respondents are asked to rate the appropriateness of each of the alternative ways of dealing with the presented problem. A total autonomy score is derived for each respondent based on his/her responses to all 32 items. This score is taken to reflect the extent to which a respondent is control-oriented versus autonomy granting in his/her communications with children.

Results and Discussion

Two variables were included in the analysis, both obtained from the modified version of the children's MEPS used in this study. These scores represent means-ends thinking in the task demands and interpersonal domains. Separate analyses of variance were used to determine if students in the more and less controlling classrooms differed in these two indices of problem solving. Before testing this hypothesis, however, the relationship between means-ends thinking in the two separate domains of socialization was examined. Somewhat surprisingly, in light of the low inter-item correlation on the interpersonal subscale, the relationship between task demands and interpersonal MEPS was statistically significant ($r = .65$, $p < .001$).

Turning to the main analyses, a significant main effect was found for one of the two teacher control orientation/student problem-solving relationships: However this result runs directly counter to what was predicted. It was the less not the more autonomy-granting teachers who had students who were better problem solvers. Before proceeding with a discussion of the finding, it is necessary to briefly describe the overall sample in terms of their control orientation. Total autonomy scores on the Deci, Schwartz, et al. (1981) measure can, in theory, range from a low of -18 (highly controlling) to a high of +18 (high in autonomy granting).

However, a truncated range of scores was obtained in instrument development work undertaken by Deci and his colleagues (Deci, Schwartz, et al., 1981). Virtually all the elementary teachers included in Deci's validation sample scored between 2.13 and 12.13. In the analyses discussed below, teachers in the present study were categorized as either lower or higher in autonomy-granting orientation. Means obtained on the Deci measure for these two groups were 2.09 and 8.25, respectively. Thus, the teacher sample in this

study consisted of groups of teachers who can probably best be termed "moderately" and "extremely" autonomy granting in their interactions with students.

This somewhat limited range of control orientations may help explain the discrepant results which were obtained. Thus, it was the moderately autonomy granting teachers who had students who were better task demands problem solvers, which is contrary to what was expected, F (1,6) = 5.80, $p < .05$. Students of the moderately autonomy granting teachers were also marginally better at solving problems in the interpersonal domain, (F (1,6) = 4.56, $p <$ .08).

Based on previous research, it was thought that teachers who preferred to be more autonomy granting would do a better job of fostering task demands and interpersonal problem-solving skills in students. Thus, Spivak, Platt, and Shure (1976) conclude that more controlling child-rearing styles are not conducive to the development of interpersonal problem-solving skills. Ryan, Connell, and Deci (1985) go a step further, arguing that autonomy-granting teachers provide children with opportunities to solve their own problems and pursue their own interests. However, based on the present study, it appears that a somewhat more controlling orientation on the part of teachers is most conducive to growth, at least in the task demands area. Before pursuing this issue, it would be helpful to take a closer look at means-ends thinking in the task demands domain. Despite an impressive amount of research supporting its validity in the interpersonal area, the MEPS technique has not been applied to other socialization domains. An examination of students' responses to the two stories in the task demands domain is thus warranted.

Not surprisingly, given the emphasis in the scoring procedure on quantity of response, students in moderately autonomy-granting classrooms had more

ideas relevant to reaching task demands goals than those in extremely autonomy-granting classrooms (M = 3.25 vs. 2.22). More to the point, some interesting classroom level differences in the quality of students' responses emerged from a more detailed analysis of interview data. Specifically, students in the classrooms that are less autonomy granting produced the greatest number of strategic responses when engaged in means-ends thinking in the task demands domain. While students in both types of classrooms tended, in their initial responses, to offer simple "seek help from the teacher" solutions, students in the less autonomy-granting classrooms evidenced more strategic thinking in their subsequent responses.

Categories of response that represent strategic thinking on the two task demands problems are presented in Tables 1 and 2. On the first problem, which involved understanding directions to a math assignment, only a handful (4) of the students in extremely autonomy-granting classrooms went beyond nonstrategic, help-seeking solutions; on the other hand, 9 of the students in the moderately autonomy-granting classrooms evidenced a preponderance of strategic means-ends thinking. On the second problem, relating to getting work in on time, a similar ratio was obtained: Strategic thinking was characteristic of 10 of the students in the more autonomy-granting classes as compared with 18 of the students in the less autonomy-granting classes. On the basis of these data, it does appear that scores on the task demands subscale represent both qualitative and quantitative dimensions of problem-solving thought. An alternative interpretation of the control orientation/social competence relationship seems warranted in light of these results.

An Informational Interpretation of the Results

When viewed from a different vantage point, it is not too surprising that teachers with only a moderate autonomy-granting orientation had students who

Table 1

Understanding Directions Story

Coding Categories Indicative of Strategic Thinking for "Means"

1. Student effort. Indications of student effort such as working hard, thinking hard, listening hard, or studying hard are scored here. The emphasis is on effort/application without reference to any particular "learning theory" strategies (see below).
2. Learning theory strategies. Coded here are specific references to strategies such as rehearsal (keeping in mind what mom and dad said), (attempted) recall (tries to remember what the teacher said), or learning transfer (relating present to past assignments).
3. Planning. Specific statements of planning, or thinking of a plan, are scored here. There must be evidence of thought followed by an attempt to execute the plan.

Table 2

Completing Work Story

Coding Categories Indicative of Strategic Thinking for "Means"

1. Contemplates suffering natural consequences. Included here are references to the story protagonist mentally focusing on the unpleasant consequences of not completing the assigned work, such as teacher punishment ("If you don't finish your work, you can't go out for recess") or teacher/parental anger. Also coded here are references to being motivated by anticipation of naturally occurring positive consequences for behavior.

2. Attempts to modify off-task behavior. Emphasis here is on the story protagonist trying to move from an "off-task" to "on-task" behavior state. This includes specific references to such as things as (a) stops talking to other kids, (b) stops classmates from interfering with work progress (asks classmates to be quiet; ignores other kids who are trying to talk to him/her).

3. Pacing. References to altering work pace (slowing down or speeding up) are scored here.

4. Effort. References to such things as working hard, listening hard, disciplining self, or trying hard to follow directions are scored here.

5. Internal characteristics/emotions. References to internal attributes such as feeling confident or energizing emotions (anger at peers for ridiculing him/her) are scored here.

6. Negotiates/seeks compromise with teacher. This category is used primarily when the subject alters the story goal to be simply that of getting out for recess, whether or not the work is completed. Scored here are references to promising the teacher to take work home, asking to go out even if work is not done, etc.

7. Planning. Specific statements of planning, or thinking of a plan, are scored here. There must be evidence of thought followed by an attempt to execute the plan.

were better problem solvers. Although unexpected, this finding is consistent with more recent work on parent socialization practices and on teaching from a social constructivist theoretical viewpoint. Whereas care must be exercised in interpreting results in the absence of data on actual classroom practice, the findings do seem to fit well with research relating to effective parenting, especially the "authoritative" style of parenting identified by Baumrind (1968, 1972). According to Baumrind, this style of parenting is associated with greater development of self-confidence, independence, and achievement motivation in children.

Baumrind (discussed in Maccoby & Martin, 1983) has identified two key factors in authoritative parenting, which she terms "demandingness" and "responsiveness." The authoritative type of parent rates high on both dimensions. In discussing Baumrind's scheme, Maccoby and Martin (1983) emphasize the importance of the informational aspect of these two dimensions. Demanding parents expect a great deal from their children and communicate those expectations in as clear and concise a manner as possible. They closely monitor their children's behavior and quickly and consistently note compliance with the understood rules (Maccoby & Martin, 1983). Responsiveness also has informational overtones. According to Maccoby and Martin, parental responsiveness differs from the earlier concept of warmth in its emphasis on <u>contingency</u>. Social reinforcement which is administered contingently (i.e., which is linked to the child's prior behavior) clearly has informational value. It allows the child to predict, and ultimately to control, social interaction.

An informational stance of the sort evidenced by authoritative parents may be more congruent with the moderately autonomy-granting response options on the Problems in Schools Questionaire (Deci, Schwartz, et al., 1981) used in the present study to assess teachers' control-autonomy orientations. These

options include elements of teacher direction (demandingness); however, they also appear to allow for a certain degree of student input or choice in resolving the problem. In the high autonomy-granting options, on the other hand, children are encouraged to work out their own solutions to problems. Teachers inclined toward this sort of approach may not provide students with enough structure to be effective. As Brickman et al. (1982) point out, "It may not be optimal for teachers to impute too much responsibility to students, if this leads them to cut down the amount of instruction, support, or discipline to less than what students actually need to solve problems" (p.379). Social constructivist theory, as represented in the writings of Palinscar and Brown (1984) and Wertsch (1979) also emphasizes the importance of teachers providing sufficient environmental structure, at least in the early stages of a child's learning. A "scaffold" metaphor is used by these researchers to describe the optimal amount of instructional support---which is viewed as temporary and adjustable.

Indirect support for the informational interpretation presented above can be found in some additional data collected in conjunction with the Socialization Outcomes Project (Anderson & Prawat, 1986), of which the present study is but a part. These data are derived from a battery of instruments administered to students. Of particular interest here are subjects' responses to an instrument assessing causality and personal control beliefs in the cognitive and social domains. Because the distinction between these two types of beliefs is of relatively recent vintage, a few words of explanation are in order. Causality beliefs are broader than personal control beliefs. They represent generalized expectancies that certain causes or conditions will result in certain outcomes; normally, they take the form "condition Y results in outcome X" (Skinner & Chapman, 1984). Weisz and Cameron (1985) prefer the

term "contingency" to causality. However, the issue is the same: the susceptibility of intended events (i.e., doing well on an exam) to causal influence.

Personal control beliefs are beliefs in one's own agency; that is, beliefs about one's capacity to produce certain intended results. The statement "I have or can produce condition Y" captures the essence of this idea. While both sets of beliefs predict performance in the classroom, causality beliefs may be more critical for two reasons: First, as Skinner and Chapman (1984) point out, causality beliefs are important in developing a sense of agency or personal control because of their strategic value; they determine the type of plans that are constructed. According to Skinner and Chapman (1984),

> Causality beliefs constitute, in effect, the subject's repertoire of ready-made plans, since the latter consist in action-outcome expectancies. If a new plan is necessary, these elementary expectancies provide the "raw material" for its construction. (p. 132)

Knowledge about why things happen is intertwined with knowledge about how to make things happen.

Judgments about whether or not one should accept personal responsibility for an outcome, on the other hand, tend to be made after the fact. Research demonstrates that individuals take more responsibility for successful as opposed to unsuccessful outcomes. People are more likely to attribute the latter to external causes that do not reflect on their self-worth.

To test the hypothesis regarding the importance of "control understanding," Connell (1985) developed an instrument that assesses both generalized knowledge in students as well as the more traditional internal-external control beliefs. The generalized knowledge scale, termed "unknown control," gets at the extent to which the child claims to understand why things happen in the cognitive and social domains. It is a negative scale in the sense that a high

score means that the child understands little about what is happening in these two domains. Children with high scores on this scale strongly agree with statements like the following: "When I get a good grade in school, I usually don't understand why," or "A lot of times, I don't know why people like me."

The informational interpretation of teacher control effects presented in this section would be strengthened if it could be shown that generalized knowledge correlates significantly with means-ends problem solving in the task demands and interpersonal domains of socialization. This, of course, assumes that teachers who grant autonomy moderately establish environments that provide more useful information (i.e., strategic information), and that this contributes to the students' general knowledgeability. In fact, unknown control does relate negatively to problem-solving ability in students in the present study.

Table 3 shows the zero-order correlations between MEPS scores and scores derived from the internal and unknown control scales on Connell's instrument. (Because of evidence presented by Harter (1981) and others indicating that children differ markedly in their willingness to assume responsibility for success and failure, positive and negative subscale results are presented separately). As Table 3 reveals, means-ends thinking in both socialization domains correlates significantly with unknown positive and negative control in the <u>cognitive</u> domain; this is not true for parallel measures in the social domain. The fact that cognitive control understanding correlates with interpersonal MEPS is somewhat troublesome; it may be that the relationship between control understanding and problem-solving ability is mediated more by the student's general intellectual ability than by any environmental "structuring" done by the teacher. Additional analyses tested this hypothesis.

Table 3

Intercorrelations of Positive and Negative Causality and Personal Control Measures With Means-Ends Problem Solving (MEPS)

	1	2	3	4	5	6	7	8	9
1. Task Demands MEPS									
2. Interpersonal MEPS	.65**								
Cognitive Unknown Control									
3. Positive	-.27**	-.38**							
4. Negative	-.31**	-.31**							
Social Unknown Control									
5. Positive	.01	.01	.46**	.38**					
6. Negative	.01	.00	.10	.12					
Cognitive Internal Control									
7. Positive	.26**	.14	-.11	-.20	.01	.11			
8. Negative	-.16	-.21**	-.06	-.01	-.11	.18			
Social Internal Control									
9. Positive	-.15	-.04	.04	.13	-.16	.23*	.09	.08	
10. Negative	-.20	-.24	.41	.19	.20	.21*	-.06	.30**	

Note: Positive = Success outcomes (i.e., getting a good grade)
Negative = Failure outcomes
* $p = .05$
** $p = .01$

Multiple regression equations were computed to predict both task demands and interpersonal subscale scores on the MEPS. Predictor variables included reading achievement scores from the previous spring (Stanford Achievement Test)--which are viewed as a surrogate for general intelligence--and the following self-report measures: Cognitive unknown control, positive and negative, and cognitive internal control, positive and negative. (These were the only variables that correlated with MEPS scores.) Results of the multiple regression analyses are shown in Table 4. As this table reveals, it is knowledge of cognitive outcomes (positive) and not achievement that is the relevant variable in accounting for differences in task demands problem solving. This bolsters the informational interpretation of results presented above. In the interpersonal domain, none of the self-report measures accounted for a significant amount of variance in problem solving when reading achievement was included as a predictor. Again, this appears consistent with the argument presented earlier. It does look as if the less autonomy-granting teachers in this study, do a better job of providing students with causality information, as did the authoritative parents described by Baumrind (1972), enabling them to develop strategies for regulating their own behavior.

In the work on socializing student task-related beliefs alluded to above (Anderson, Stevens, Prawat, & Nickerson, in press), two classroom dimensions were singled out as being particularly important. The first dimension of teacher practice identified in this research was informational in nature: the extent to which teachers structure information about the environment to render it more predictable and understandable for students. This aspect of the classroom environment was seen as being particularly important in the development of "control understanding" in students (Skinner & Connell, 1986). (A number of other researchers have also noted that predictability is closely

Table 4

Multiple Regressions Used to Examine Correlates of Task Demand and Interpersonal Means-Ends Problem Solving (MEPS)

	F to Enter	Significace	Multiple R	R Square Change	Overall F
Task Demands MEPS					
Reading	.27	.61	.23	.05	3.10
Cognitive Internality--Positive	.11	.74	.23	.00	(p < .018)
Cognitive Internality--Negative	2.93	.09	.34	.06	
Cognitive Unknown--Positive	4.03	.05	.47	.11	
Cognitive Unknown--Negative	1.63	.21	.50	.03	
Interpersonal MEPS					
Reading	5.03	.03	.43	.18	4.02
Cognitive Internality--Positive	1.87	.18	.45	.03	(p > .005)
Cognitive Internality--Negative	2.59	.11	.50	.05	
Cognitive Unknown--Positive	.88	.35	.53	.03	
Cognitive Unknown--Negative	1.29	.26	.55	.02	

tied to control; see Rodin, 1986.) The amount of opportunity afforded students to engage in self-regulated activity was the second classroom dimension thought to play an important socialization role with regard to task-related attitudes. The fact that this variable emerged in qualitative analyses of narrative-descriptive data provided some of the rationale for the hypothesized link between teacher autonomy and student means-ends thinking in the task demands and interpersonal domains.

The information/opportunity dimensions were viewed as complementary, with the latter contributing, in particular, to students' perceptions of competence. Results of the present study, however, suggest that the information/opportunity link may be more conditional than complementary. The following argument connects these two research studies. Providing students with well structured information about the classroom environment contributes to students' strategic problem-solving ability in two ways: First, it reduces the ambiguity and risk associated with more mundane areas of classroom life, thus freeing students to be more mindful about the things that really matter; second, it provides information about why events occur in the classroom (particularly task-related events). As Skinner and Chapman (1984) point out, causality information directly contributes to strategic thinking in youngsters.

The ability to think strategically, in turn, is probably essential if students are to practice self-regulation successfully in the classroom. Thus, it is important that teachers provide students with enough opportunity to self-regulate--but only in the context of having equipped them strategically to handle the opportunity. In other words, strategic thinking is a prerequisite for successful self-regulation on the part of students. This and related hypotheses must be examined in subsequent research.

A second, related issue that should be addressed in future research is the extent to which the hypothesized curvilinear relationship between teacher control orientation and student means-ends thinking holds up in a sample of teachers representing a wide range of control orientations. As noted, the sample in the present study was somewhat restricted in this regard. Another important issue that deserves future consideration is the extent to which teachers' control orientations in the classroom are "equal" in both interpersonal and task demands areas. It may be that teachers generally assume greater responsibility for socializing students in the task demands domain, viewing interpersonal relations as more of an "individual difference" variable. Related to this notion is Harter's (1981) research suggesting that the cognitive and social domains are perceived quite differently, at least by young children. According to Harter, young children "do not view social acceptance by peers or mother as an arena of their life that requires skill or competence" (p. 233). This may be true of teachers as well, despite the high priority they place on social outcomes (Prawat & Nickerson, 1985).

Another issue to be explored in future work is the possible interaction between teacher control and goal orientations. Halperin's (1976) research is instructive in this regard. She found that teacher goal orientations interact with their control ideology to influence student social adjustment. Specifically, Halperin found that first graders had a difficult time adjusting to teachers who held seemingly incongruent or inconsistent beliefs (i.e., social goals with a highly controlling orientation, or academic goals combined with a more permissive, autonomy-granting outlook). Halperin speculated that such teachers send confusing or ambiguous messages to students. It would be instructive to examine the unknown control perceptions of students in "consistent" and "inconsistent" classrooms, using Halperin's definition.

In the present study, as in Halperin's study, a straightforward relationship between teacher control orientation and student adjustment was not indicated. In all probability the "optimal" level of teacher autonomy granting will vary as a function of several factors: for example, what the teacher is trying to accomplish, the students' developmental level, the students' prior exposure to similar styles of teaching. It is unrealistic to expect that there is one best approach to teaching as regards teacher control orientation. Results of the present study support this contention by showing that a high level of autonomy granting on the part of teachers is associated with a lower rather than higher level of social problem-solving ability in students.

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